

LANDSCAPE PLANS FOR THE DEVELOPMENT OF
A GARDEN THEATRE

by

GUILFORD BURNETT GRANT

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INTRODUCTION

The purposes underlying the study of the design of a garden theatre are several fold. Due to the growing popularity and the lack of information on the subject, the design of a garden theatre offers a problem for original study. The college campus, Kansas State College, Manhattan, Kansas, offers an ideal building site for the development of a garden theatre. This theatre will provide the college with an area out-of-doors for graduation exercises, musicals, pageants, and other college activities during the fall, spring, and summer months.

The designer's one limiting factor was that the style of the outdoor theatre had to be of the garden type, to suit the topography of the building site. However, the practicability of the theatre was kept in mind in the development of the design, the planting, and the grading plans. The development of this theatre on the campus of Kansas State College would prove a practical addition to the college plant and greatly enhance the beauty of the campus.

With these thoughts in mind, the designer presents what is believed to be a satisfactory solution of the problem.

PROCEDURE IN DESIGN

In determining the style of this outdoor theatre (general term for open-air theatres) the first step was to make a topographic map of the area selected for the building site. This area is located just east of the Formal Garden north of Lovers Lane and extends to the pine grove. By making a profile of the area along the axis of the proposed theatre it was found that the stage space would have to be built up in order to give good visibility of the stage from all parts of the amphitheatre. This eliminated the idea of the forest type of theatre with a naturalistic stage at the west edge of the pine grove. Elevating the stage makes it impossible to see the trunks of the pine trees beyond. Only the tops of the trees can be seen as a naturalistic background of evergreen trees for the stage setting. This existing pine grove adds very much to the beauty of the theatre.

Of the several types of outdoor theatres, stadiums, Greek theatres, nature theatres, and garden theatres, the most suitable for this building site is the garden theatre with its sheared hedge for stage background and stage wings.

In designing the theatre, three salient principles, comfort, visibility, and audibility, were kept in mind. Comfort in seating the audience depends on the slope of the amphitheatre, type of seats, and amount of space allowed each person. To permit easy passage between the rows of seats and allow ample width for the seats each person is allotted six square feet, three feet between the rows and each seat two feet in width. In seating an audience out-of-doors, it must be remembered those in attendance desire a sense of freedom, of the openness of nature. They must not be crowded as is permissible in an indoor auditorium.

Folding chairs with duck-boards will be brought in for each performance. Duck-boards consist of two boards. One board, placed under the front of the chair, is one inch thicker than the board placed under the rear legs of the chair. This difference in thickness is to compensate for

the slope of the amphitheatre and prevent a forward pitch of the chairs. In other words, these boards aid in obtaining comfort and also prevent the chair legs from sinking into the turf.

After a person is seated comfortably and in order to remain so, he must be able to see and hear what is taking place on the stage. The theatre is designed so that every person in the audience can see the stage between the heads of the people in the first row in front of him and over the heads of the people in the second row ahead from any point in the seating space. The problem of hearing is not a difficult one, as one can be heard speaking in a natural tone for a distance of 200 feet in the open. Audibility for this theatre will be aided by the pine grove and sheared hedge of the stage on the east, the Lombardy Poplar allee on the west, the tree and shrub plantings on the north and south. These plantings will also reduce the effect of the winds.

Determining the per cent of slope was one of the major problems in the design of this particular theatre. To a great extent the success or failure of a garden theatre depends on the relationship of the slope of the amphitheatre to the elevation of the stage. The height of the stage in

relation to the ground elevation at the first row of seats was determined by the following formula:

$$E_1 = H - \frac{D_f}{D_b} (B-H)$$

Let E_1 = elevation of eye at front row

H = elevation at top of footlight hedge

B = elevation at back of stage

D_b = horizontal distance from eye in front row to back of stage

D_f = horizontal distance from eye on front row to footlights" (32).

In using this formula, the first step is to decide on a definite value or elevation for H , the elevation at the top of the footlight wall. The elevation of 90 was chosen for this value (the system of contours was worked out from a B. M. of 100 elevation as shown on the grading plan, plate I). The value of 90 for this elevation made necessary a fill of only two feet on the front part of the stage and a cut of one and five-tenths feet in the orchestra pit. This solution necessitates the construction of a retaining wall of native limestone three and five-tenths feet high in front of the stage and extending along the outside aisles until the slope made by the cut blends into the natural grade, see grading plan, plate I. The grade

from the sides and back of the stage will be a 20 per cent slope as shown by the proposed contours in plate I. By knowing the value of H and substituting the other values in the formula which are obtained directly from the plan, the elevation of the eye height of a person sitting in a chair in the front row can be obtained. This height is found to be three and seven-tenths feet. If the elevation of the eye-height is obtained by the formula, the ground elevation can easily be determined by subtracting three and seven-tenths from this value, E_1 . The remaining slope was worked out so that each person will be able to see over the heads of the people in the second row ahead. By looking between the heads of those in the first row everyone will be able to see.

The ideal slope for a garden theatre should not exceed eight per cent at any point. However, this is not a fixed rule. The slope for this theatre for the first 20 rows of seats and the cross aisle of nine feet will be 11 per cent. For the remaining 15 rows of seats the slope will be 15 per cent. The eight per cent slope could not be used for two reasons. First, it would have been necessary to build up the stage more than six feet, and this is not practical. Second, to lower the stage to a desirable elevation so that shrubs can be grown thereon suc-

cessfully would necessitate a tremendous cut over the entire amphitheatre. By this solution, most of the seating space would have been below the natural level of the existing ground elevations. In order to bring the grade to the surface of the existing slope, an imaginary line in profile was drawn from the elevation at the first row of seats, as worked out by the formula, to the existing elevation at the last row of seats. This gave a slope of 11 per cent. By plotting graphically the eye-heights and head-heights in every third row, it was found that good vision could be obtained for a distance of 62 feet from the first row of seats. By the same graphic method of plotting, it was found that the remaining slope would have to be 15.5 per cent in order to provide good vision of the stage.

Dressing Rooms

Tent dressing rooms will be used when the occasion demands. There is ample space east of the stage under the pines for this purpose. There is also an existing service drive just east of the stage which will service the theatre.

Seating Capacity

This theatre provides a seating capacity of approximately 3,575 allowing six square feet per person and not including the entrance and exit aisles. There are 2,812 square feet on the stage proper, not including planting space for hedge. This means that 500 people can be seated on the stage by placing the group more closely together than in the audience. The seating space will be sodded to a bluegrass turf.

Parking Space

No parking space for automobiles will be provided other than that already provided on the campus.

Orchestra Pit

The orchestra space is 20 feet in width and extends the length of the stage. A temporary wood platform for the piano will be brought in when it is needed.

Drainage

The entire audience space drains towards the stage. To take care of the surface water, two eight inch tile drains will be installed to the right and the left of the stage at each end of the orchestra pit as shown on the grading plan, plate I.

Features

Garden theatres should not contain architectural features other than essentials, such as steps and retaining walls. The stage is formal in that a sheared Juniperus virginiana, red cedar, hedge is used for a background and stage wings. The remaining part of the theatre, with the exception of the formal allee entrance, is naturalistically planted to representative groups of trees and shrubs of Kansas. The stage is made up of two parts, the main stage, and the upper stage. The upper stage is six inches higher in elevation than the main stage, and both have a forward slope of one and five-tenths per cent. There are four entrances to the main stage and two entrances to the upper

stage. For stage dimensions, see grading plan, plate I, and for height of hedge see planting plan, plate II.

Plans Submitted

The following plans are respectfully submitted with the thesis; except plate IV, all are drawn to the scale one inch equals ten feet.

1. Grading plan, on tracing cloth, shows the existing and proposed contours and the profile through the central axis. All dimensions for construction are shown on this plan.

2. Planting plan, on tracing cloth, shows the existing trees and proposed trees and shrubs. All trees and shrubs will be listed alphabetically according to botanical names, and the total number of each species will be given. Each species of trees and shrubs is designated on the plan by a key number.

3. General plan, rendered in water color on Schoolers parcle water color paper, shows the complete plan of arrangement of the theatre.

4. Perspective of the stage, rendered in water color on Fabriano water color paper, shows the designer's con-

ception of the stage in elevation.

SUMMARY

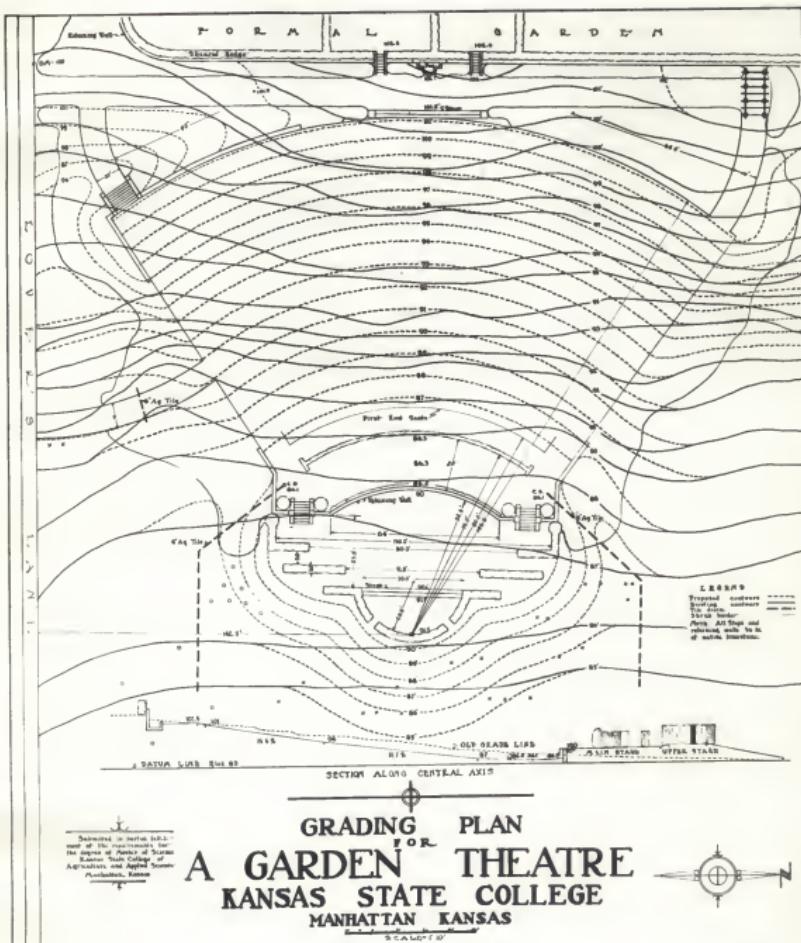
The author designed this garden theatre with the idea or thought in mind that it would be constructed on the campus of Kansas State College in the near future. The design is simple and practical for the location for which it was designed. All trees and shrubs used are well adapted to Kansas.

The author feels sure that a garden theatre, as designed, will fulfill the need for outdoor entertainment on the campus of Kansas State College of Agriculture and Applied Science.

Explanation of Plate I

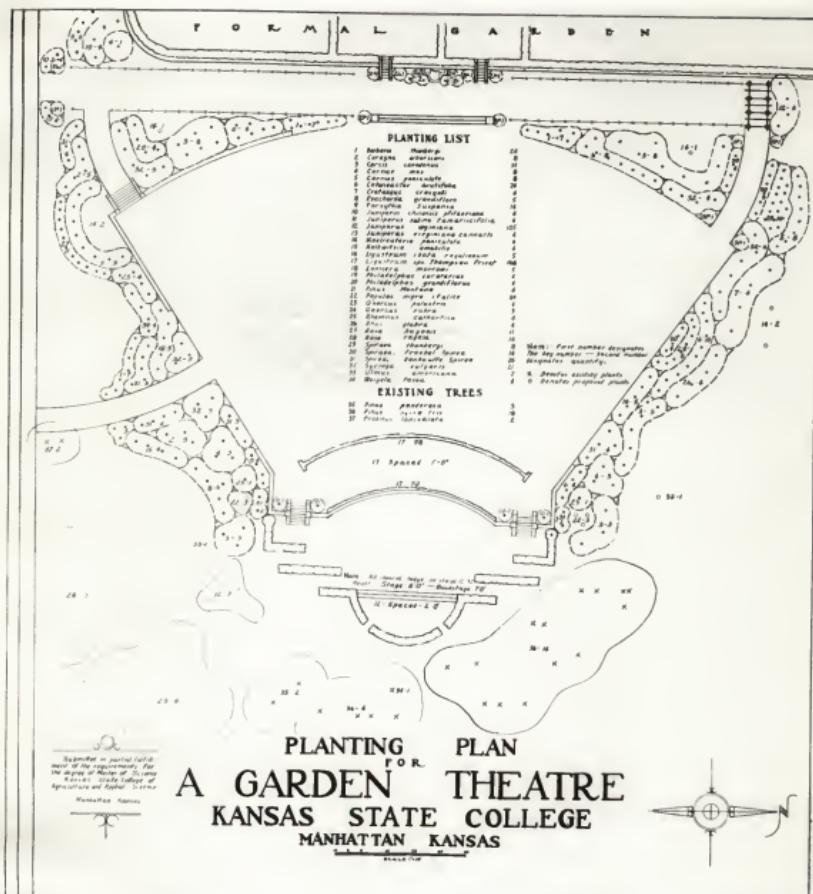
Grading Plan

PLATE I



Explanation of Plate II
Planting Plan

PLATE II



Explanation of Plate III

General Plan

PLATE III



GENERAL PLAN
for
A GARDEN THEATRE
KANSAS STATE COLLEGE
MANHATTAN, KANSAS

SCALE - 174' 10"

G. B. Scott

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE COURSE OF STUDY OF KANSAS STATE COLLEGE, MANHATTAN, KANSAS

Explanation of Plate IV

Perspective



PERSPECTIVE
FOR A GARDEN ~ THEATRE
KANSAS STATE COLLEGE
MANHATTAN, KANSAS.

PLANTING KEY

1. Berberis thunbergi - DC.
2. Caragana arborescens - Lam.
3. Cercis canadensis - L.
4. Cornus mas - L.
5. Cornus paniculata - L'Her.
6. Cotoneaster acutifolia - Turez.
7. Crataegus crusgalli - L.
8. Elaeagnus grandiflora - Heck.
9. Forsythia suspensa - Vahl.
10. Juniperus chinensis pfitzeriana - Spaeth.
11. Juniperus sabina tamariscifolia - Ait.
12. Juniperus virginiana - L.
13. Juniperus virginiana canariensis - Senecl.
14. Koelreuteria paniculata - Laxm.
15. Kolkwitzia amabilis - Graebn.
16. Ligustrum ibota regalianum - Rehd.
17. Ligustrum spp. Thompson Privet
18. Lonicera morrowi - A. Gray.
19. Philadelphus coronarius - L.
20. Philadelphus grandiflorus - Willd.

21. Pinus montana - Zenari.
22. Populus nigra italicica - Dur.
23. Quercus palustris - L.
24. Quercus rubra - L.
25. Phamnus cathartica - L.
26. Rhus glabra - L.
27. Rosa hugonis - Remsel.
28. Rosa rugosa - Thumb.
29. Spiraea thunbergi - Sieb.
30. Spiraea, Froebel Spirea - Hort.
31. Spiraea, Vanhoutte Spirea - Zabel.
32. Syrinx vulgaris - L.
33. Ulmus americana - L.
34. Weigela rosea - Lindl.

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BIBLIOGRAPHY

1. Armstrong, S. A.
Under the greenwood trees. Craftsman, 12: 620-628. Sept. 1907.
2. Braden, G. H.
Municipal and school outdoor theatres in California. Playground, 22: 624-628. Feb. 1929.
3. Burroughs, C. H.
Greek theatre at Bloomfield Hills, Michigan. Art and Archaeol, 5: 172-179. March, 1917.
4. Campbell, J. C.
New use for old tennis courts. House Beautiful, 53: 506. May, 1923.
5. Cheney, Sheldon.
Garden theaters. Country Life, 27: 43-45. March, 1915.
6. Cheney, Sheldon.
Seeing our plays out-of-doors. Craftsman, 30: 435-447. Aug. 1916.
7. Cheney, Sheldon.
The open-air-theatre. New York. Mitchell Kennerley, 188 p. 1918.
8. Clark, W. H.
Nature carves a theater and sets the stage; pageant-play, Conquistadores, at Red Knolls Desert Theater, Arizona. School Arts Monthly, 34: 579-585. June, 1935.
9. Crowder, I.
Theater-in-the-woods, Cheyenne mountain school. Drama, 19: 181. March, 1929.

10. De Weerth, E.
Italy outdoors; open-air theater performances.
Theater Arts Monthly, 19: 367-377. May, 1935.
11. Dietz, A., and Von Boeskirk, J. K.
Curtain at 8 p. m.: W.P.A. park board outdoor
theater, Minneapolis. Recreation, 30: 495-497.
Jan. 1937.
12. Dukes, A.
Scene in Europe. Theater Arts Monthly, 20: 771-
775. Oct. 1936.
13. Gerke, J. H.
Garden theater. Playground, 19: 100. May, 1925.
14. Gornseth, J. E.
Sioux City's new amphitheater with band shell.
Recreation, 29: 260-262. Aug. 1935.
15. Grau, R.
What California has achieved in theaterdom.
Harpers Weekly, 55: 12-13. Dec. 1911.
16. Hackett, F.
Open-air performances. New Repub. 5: 162.
June 12, 1916.
17. Fisk, C. G.
Greek theatre for University of California.
Outlook, 77: 834-835. Aug. 6, 1904.
18. Howard, C. E.
Carefully designed garden theater. Amer. City,
43: 132. Dec. 1930.
19. Lees, D. W.
Garden theatre of Marlia. Theater Arts Monthly,
16: 484-492. June, 1932.
20. MacFarland, G.
Annual plays at Carmel's forest theatre. Over-
land, 68: 239-243. Sept. 1916.
21. Mackay, C. D.
Outdoor industrial theaters. Playground, 13:
433-438. Dec. 1919.

22. Mackay, H.
Outdoor plays and pageants. *Independent*, 68: 1227-1234. June, 1910.

23. Popham, W. P.
Ragdale Ring, a garden theater of the intimate type. *House Beautiful*, 61: 325. March, 1927.

24. Pratt, O. G.
Salon's municipal outdoor theater. *Amer. City*, 30: 665-666. June, 1924.

25. Rebok, H. M.
Unique memorial to heroes. *Amer. City*, 21: 140. Aug. 1919.

26. Roberts, M. F.
Greek drama and French music in nature's loveliest theater. *Craftsman*, 30: 607-615. Sept. 1916.

27. Roeder, R.
Open-air theater. *Theater Arts Monthly*, 13: 602-610. Aug. 1929.

28. Row, A.
Open-air theaters in America. *Harpers Weekly*, 58: 21. Oct. 4, 1913.

29. Smith, J. W.
Some of the famous open-air theaters in America. *Craftsman*, 30: 502-511. Aug. 1916.

30. Stoll, H. P.
Where theaters are out-of-doors. *Literary Digest*, 47: 20-21. July, 1913.

31. Tabor, G.
Entertaining in the garden. *Garden Magazine*, 30: 9-15. Aug. 1919.

32. Taylor, Albert D.
Notes on garden theaters. *Land. Arch.* 21: 209 227. April, 1931.

33. Totheroh, D.
Open-air-theater, California's contribution.
Theater Arts Monthly, 12: 667-675. Sept. 1928.

34. Waugh, Frank A.
Outdoor theaters. Boston. Richard G. Badger,
151 p. 1917.

35. West, H. M.
Outdoor theater. Drama, 14: 225. March, 1924.